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# The Implementation of Cooperative Learning Course Review Horay Type Aided Macromedia Flash Media in Integral Calculus Course

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## Abstract

Research question of this research study is how to increase students' active learning, students' responses, and students' learning outcomes in integral calculus course implementing cooperative learning course review horay type aided macromedia flash media?

This is a classroom action research. Data collection techniques use observation, questionnaires, and test. The data are analyzed descriptively. The subjects of this research study are students taking integral calculus course in Study Program of Mathematics Education, Faculty of Teacher Training and Education, the University of Bengkulu, in Semester III Class A at academic year 2013/2014.

Based on this research can be conclude that (1) The way to increase students' active learning are designing questions with answers without integer numbers, dividing students into heterogeneous groups of 4-5 students, explaining the rule of using macromedia flash media, asking students to pay attention to the lecture randomly displaying questions, and asking each group to discuss in a specified time, and if they are late, their group will get pinalty. (2) The way to increase students' responses are asking students to yells without instructions, and stimulating other students with questions to respond to presented works. The way to increase students' learning outcomes: reminding students that they have work together and discuss the answers, reminding students that if they work together, the questions can be solve easier, asking students to write their answer on a paper, asking students to draw the figure of their answer on a paper and choosing students as representatives of groups to present the groups' answers.

*Keywords : course review horay, macromedia flash, integral calculus*

## 1. Background

Integral calculus is a compulsory course in Study Program of Mathematics Education. Integral calculus course is a prerequisite course for students of Mathematics Education for attending multivariable calculus course, ordinary differential equations course, and complex functions course. Before the curriculum change in 2007, this course was called calculus II, which was a compulsory course in Department of

Mathematics and Natural Sciences. In teaching this course, lecturers explain concepts to students, giving examples, and then ask the students to work on exercises. At the end of meetings, lecturers give students homework. This causes a monotonous learning and it leads to saturation at students, less students' active learning, and students can not maximize their academic abilities. In the first semester of academic year 2012/2013, the average score of students in this course is 77.96 for class A and 62.18 for class B.

Lecturers should be able to apply learning models which can increase students' active learning and learning outcomes. One of the learning models that can be developed is a cooperative learning course review horay type. This learning model emphasizes student understanding by completing a given problem and the teacher can shape the nature of positive dependence among students, train students to appreciate individual differences, develop students' skills in collaboration between groups, and create a pleasant classroom atmosphere (Sugandi & Rahayu: 2012) .

Teaching and learning activities using media will make a better process and learning outcomes (Djamarah & Zain: 2002). One of the instructional media that can be used in cooperative learning course review horay type in integral calculus course is macromedia flash media. This media can display animations and allow users to use the mouse or keyboard interactions that makes teaching and learning more interesting and fun so that motivates students to learn. Thus this activity is expected can increase students' active learning and learning outcomes. Therefore, this study wants to examine the implementation of cooperative learning course review horay type aided macromedia flash media to increase students' active learning, responses, and learning outcomes in integral calculus course.

## 2. Reseach questions

Research questions of this research study are:

1. How to increase students' active learning in integral calculus course that implement cooperative learning course review horay type aided macromedia flash media?
2. How to increase students' responses in integral calculus course that implement cooperative learning course review horay type aided macromedia flash media?
3. How to increase students' learning outcomes in integral calculus course that implement cooperative learning course review horay type aided macromedia flash media?

## 3. Theoretical description

### a. Cooperative learning

Slavin (1995) in Isjoni (2007) revealed that cooperative learning is learning that encourages students to work in small groups of 4-6 people in a group. Lecturers in this activity act as a facilitator.

Cooperative learning is a learning approach that provides an opportunity for students to act as teachers and provide an explanation for their friends about a particular subject matter (Leikin & Zaslavsky, 1999). Implementation of cooperative learning causes a sense of responsibility in students to master certain materials and foster cooperations between the students with other students.

### b. Cooperative learning Course Review Horay (CRH)

Course Review Horay (CRH) is a type of cooperative learning that emphasizes understanding of students in solving problems, in which answers are typed in boxes

(Sugandi & Rahayu, 2012). Steps of cooperative learning Course Review Horay type (CRH) according to Uno and Mohamad (2011: 126) are as follows: (1) Lecturers convey competence to be achieved; (2) Lecturer demonstrating/presenting the material; (3) Giving students the opportunity debriefing; (4) To test comprehension, students were told to make a box 16/09/25 suits needs and each box is filled with a number; (5) Lecturers read questions randomly and students write the answers in the box whose number is mentioned by lecturers and directly discussed, if the answer is true, fill mark (√) and if the answer is false, fill a cross (x); (6) Students who have got marks √ vertical, horizontal, or diagonal must shout horay! or other slogans; (7) Students' value calculated from the number of correct answers horay! Obtained; (8) Closing.

**c. Teaching media**

Media is a tool that has a function as a transmitter. Nana Sudjana (1991) in Djamarah and Zain (2002) suggested practical values of teaching media as follows: (1) Give real foundation for thinking; (2) Increase interests and attentions of students to learn; (3) Give foundation for the development of learning so that the learning outcomes increased steadily; (4) Provide real experiences and can grow students activities; (5) Foster orderly and sustainable thinking; (6) Help to foster thinking and abilities to speak; (7) Provide learning experiences that are not easily obtained in other ways; (8) Teaching materials have clearer meaning; (9) More varied teaching methods; (10) Students do more learning activities.

**d. The use of computers as a medium of learning mathematics**

Computers, as one of the technology, can be a medium of learning. There are several softwares that can be used in teaching mathematics. Even, there are manufactures produce special softwares for learning math. Lecturers can also design their own learning activities using software to assist students in understanding mathematical concepts.

The use of computers is as a medium to motivate students in learning mathematics. It is associated with increasing positive attitudes of students and decreasing negative attitudes of students towards learning mathematics using computer media compared to using the traditional method (Dix, 1999). Students can become more active in the learning of mathematics using computer media. The use of computer media gives more opportunities to students to explore and investigate (Dix, 1999). Therefore, teachers should have the knowledge and skills to create and use computer media. Lecturers' confident attitude in using computer affects student achievement (Britain, Bramald & Higgins, 1999 in Forgazs, 2002).

Forgazs (2006) also highlighted the causes of the lack of motivation to create and use computer media, namely the difficulty of gaining access using computers; lecturers' perceptual that the use of computer media require special skills; technical difficulties; lecturers' concern of the lack of time to prepare and teach mathematics using computer media; the lack of appropriate software; the lack of confidence and abilities of teachers to create and use computer media; concerns that students engage in activities that irrelevant to learning instructions; availability of graphing calculators; separation of computer usage from mathematics learning; the lack of ability of students to use the keyboard.

**e. Macromedia flash**

Macromedia flash software is computer software that has built-in programming language that works on Windows operating system, and has a broad scope of capabilities and very sophisticated. Macromedia flash has the ability to incorporate visual programming object-oriented into development environment that helps programmers.

Macromedia flash software used to create the media in this study were software macromedia flash 8. The advantages of macromedia flash 8 software compared to other similar programs: (1) Can create interactive buttons with a movie or other object; (2) Can make a change in the color transparency movie; (3) Can create various animations; (4) Can create animated motion by following a predetermined groove; (5) Can be converted and published (publish) in some types of which are:. Swf,. tml,. Gif,. Jpg,. Png,. Exe,. Mov; (6) Can process and create animations from Bitmap object; (7) Flash vector-based animation programs have flexibility in making vector objects.

Capabilities of the macromedia flash 8 can be developed in the world of education that is in the making simulation visualization and animation so that teaching becomes more interesting and fun. Devices or features in macromedia flash 8 can be used to create and modify objects of art (Adriyanto : 2010).

**f. Students' active learning, responses, and learning outcomes**

Active in teaching and learning means lecturers should be able to create a learning environment where students active both physically and spiritually (Sriyono, et al, 1992). Sudjana (2009) explains that active in the teaching and learning activities may include assignments, participating in problem solvings, looking for information to solve problems, asking friends or lecturers if there are things that are not yet understood, discussing, assessing their own capabilities, training themselves to solve problems, applying acquired knowledge and skills. Dimyati and Mudjiono (2009) describe the things to do in teaching and learning activities to create students' active learning, namely using a variety of methods and media, giving assignments, asking students to do experiments, reading materials, and writing things that have not understood, discussing, as well as questioning and answering. Students' responses can be students' opinions on their interest, a sense of excitement and currency, and easiness of understanding components of subject matters, format of learning materials, learning activities, learning environment, and how teachers teach (Trianto, 2010). Students' learning outcomes is students' acquisition after they follow teaching and learning process (Dimyati & Mudjiono, 2009). Learning outcomes are divided into three domains, namely cognitive, learning outcomes related to intellectual, affective domain, dealing with attitudes, and psychomotor domains, associated with skills and abilities to act (Sudjana, 2009).

## 4. Research Methodology

This research was Classroom Action Research (CAR). Kasbolah (1998: 15) said that action research is a class act in the field of educational research conducted within the classroom in order to improve and enhance the quality of learning. The procedures of the implementation of a Classroom Action Research are as follows: (a) Action plan; (b) The implementation of action; (c) Observation; (d) Reflection (Kasbolah, 1998: 70).

This study was conducted in the first semester of academic year 2013/2014 in Study Program of Mathematics Education, Faculty of Teacher Training and Education, University of Bengkulu. The subjects of this research study were students taking

integral calculus course in Study Program of Mathematics Education, Faculty of Teacher Training and Education, University of Bengkulu, in Semester III Class A.

Data collection techniques in this study were as follows: (a) Observation, which was used to observe the students' active learning during learning activities in integral calculus courses implementing cooperative learning course review horay assisted macromedia flash; (b) Questionnaire, which was used to determine responses of students towards learning integral calculus courses implementing cooperative learning course review horay assisted macromedia flash; (c) Tests, which were conducted to determine students' learning outcomes in learning integral calculus courses implementing cooperative learning course review horay assisted macromedia flash. Data obtained from observations, questionnaire, and test results are analyzed desriptively, namely the data are described in the form of statements. Test scores were analyzed by using the students' average values. Average values $(\bar{x})$ are calculated by using a formula:

$$\bar{x} = \frac{\sum x}{N} \quad (4.1)$$

Annotation : $\bar{x}$ = students' average values
$\sum x$ = students' total values
$N$ = number of students

(Daryanto, 2011:191)

## 5. Results

Classroom action research was conducted in three cycles in integral calculus courses 3-1 credits in the Study Program of Mathematics Education. Teaching materials for cycle 1 was the area of a plane region, cycle 2 was volumes of solids : slabs, disks, washers, and cycle 3 was volumes of solids of revolution : shells.

**a. Cycle 1**

*1. Action Plans 1*

Action plans cycle 1 consist of: (1) Formulated actions to address the problem of not active students; (2) Formulated actions to address the problem of low learning outcomes.

*2. Implementation of actions 1*

In cycle 1, Implementing teaching and learning integral calculus courses applying cooperative learning course review horay aided macromedia flash media was conducted with the following steps: (1) Lecturer delivered basic competencies and learning outcomes indicators; (2) Lecturer presented material; (3) Lecturer gave students a question and answer opportunity; (4) Students were divided into groups by the number of members of the heterogeneous groups of 4-5 students; (5) Lecturer gave macromedia flash media for student to student; (6) Lecturer explained the general discussion that will be done; (7) Lecturer read questions selected randomly on macromedia flash media for lecturers; (8) Lecturer asked each group to discuss directly the answer of questions in the group; (9) Students typed answer in a box that number is mentioned by the lecturer. If the answer is correct, true mark (√) will appear. If wrong, a cross (x) will appear; (10) Lecturer asked representatives of groups to present the groups' answers; (11) Lecturer asked other students to respond to presented works of their friend; (12) Lecturer continued reading numbers selected on macromedia flash media for lecturers as in step 7, followed by steps 8, 9, 10 and 11, and so on until all numbers are read; (13)

Students who have got marks √ vertical, horizontal, or diagonal must have shouted horay! or other yells; (14) Lecturer determined students' marks from the number of correct answers and the number of horay! that students obtained.

3. *Observation 1*

From observations during the implementation cycle 1 obtained the following matters: (1) Students were good in observing the lecturer' explanation; (2) Students were fair in asking to the lecture the things that they do not understand; (3) Students were fair in listening to the lecturer reading the questions displayed using macromedia flash media; (4) Students were fair in using macromedia flash media for students; (5) Students were fair in paying attention to the lecture randomly displaying questions using macromedia flash media; (6) Students were fair in working together to solve problems; (7) Students were fair in discussing the answers of the questions with their friends in a group; (8) Students were less in saying horay! or other group yells; (9) Students were fair in presenting their group's answer; (10) Students were fair in responding to the presentation of their friends' work; (11) Students were slow in work on the problems so only four questions that can be discussed; (12) Students got cross (x) for their answer because of use comma (,) instead of dot (.) and wrong in integration of numbers, meanwhile their answer can be considered as a right answer. Based on the observation sheet Cycle 1 known that students' active learning in integral calculus course that implemented cooperative learning course review horay type aided macromedia flash media got score 20 with category moderately active.

4. *Final Test Cyce 1 Score*

Based on the analysis of the score of the test cycle 1 known that average of student test scores was 47.44.

5. *Questionnaire Cycle 1*

Based on the analysis of questionnaire cycle 1, known that 3.03% students had very negative respons, 3.03% students had negative respons, 63,63% students had positive respons, and 30.30% students had very positive respons.

6. *Reflection 1*

The things that had been achieved in cycle 1: (1) Students were good in observing the lecturer' explanation; (2) Students were fair in asking to the lecture the things that they do not understand; (3) Students were fair in listening to the lecturer reading the questions displayed using macromedia flash media; (4) 63,63% students had positive respons and 30.30% students had very positive respons.

The failures in cycle 1: (1) Students were fair in using macromedia flash media for students; (2) Students got cross (x) for their answer because of use comma (,) instead of dot (.) and wrong in integration of numbers, meanwhile their answer can be considered as a right answer. So, it is a weakness of the media; (3) Students were fair in paying attention to the lecture randomly displaying questions using macromedia flash media; (4) Students were fair in working together to solve problems; (5) Students were fair in discussing the answers of the questions with their friends in a group; (6) Students were less in saying horay! or other group yells; (7) Students were fair in presenting their group's answer; (8) Students were fair in responding to the presentation of their friends' work; (9) Students were slow in work on the problems so only four questions that can be discussed; (10) Based on the observation sheet Cycle 1 known that students' active learning got score 20 with category moderately active; (11) Based on the analysis of the score of the test cycle 1 known that average of student test scores was 47.44.

**b. Cycle 2**

*1. Action Plans 2*

In cycle 2, the action plans: (1) Overcome students who were still fair in using macromedia flash media for students; (2) Overcome media problems that was students get cross (x) for their answer because of use comma (,) instead of dot (.) and wrong in integration of numbers, meanwhile their answer can be considered as a right answer; (3) Overcome students who were still fair in paying attention to the lecture randomly displaying questions using macromedia flash media; (4) Overcome students who were still fair in working together to solve problems; (5) Overcome students who were still fair in discussing the answers of the questions with their friends in a group; (6) Overcome students who were still less in saying horay! or other group yells; (7) Overcome students who were still fair in presenting their group's answer; (8) Overcome students who were still fair in responding to the presentation of their friends' work; (9) Overcome students who were slow in work on the problems; (10) Overcome students who had low learning outcomes.

*2. Implementation of actions 2*

As the implementation of actions in cycle 2, the instructional process of integral calculus courses applying cooperative learning course review horay aided macromedia flash media followed these steps: (1) Designed questions with answers without integer numbers; (2) Lecturer delivered basic competencies and learning outcomes indicators; (3) Lecturer presented material; (4) Lecturer gave students a question and answer opportunity; (5) Students were divided into groups by the number of members of the heterogeneous groups of 4-5 students; (6) Lecturer gave macromedia flash media for student to student; (7) Lecturer explained the rule of using macromedia flash media that once they insert an answer to the box, they can not change it; (8) Lecturer asked students to pay attention to the lecture randomly displaying questions using macromedia flash media; (9) Lecturer explained the general discussion that will be done; (10) Lecturer asked students to write their answer on a paper; (11) Lecturer reminded students that they have to work together and discuss the answers of questions with their friends in a group; (12) Lecturers read questions selected randomly on macromedia flash media for lecturers; (13) Lecturer asked each group to discuss directly the answer of questions in the group in a specified time; (14) Students typed answer in a box that number is mentioned by the lecturer. If the answer is correct, true mark (√) will appear. If wrong, a cross (x) will appear; (15) Lecturer chose students as representatives of groups to present the groups' answers; (16) Lecturer stimulated other students to respond to presented works of their friend; (17) Lecturers continued reading numbers selected on macromedia flash media for lecturers as in step 12, followed by steps 13, 14, 15, and 16, and so on until all numbers are read; (18) Students who had got marks √ vertical, horizontal, or diagonal would get bonuses after they shouted horay! or other yells; (19) Lecturer determined students' marks from the number of correct answers and the number of horay! that students obtained.

*3. Observation 2*

Observations during the implementation cycle 2 described the following matters: (1) Students were good in using macromedia flash media for students; (2) Students were good in paying attention to the lecture randomly displaying questions using macromedia flash media; (3) Students were fair in working together to solve problems; (4) Students were fair in discussing the answers of the questions with their friends in a group; (5) Students were good in saying horay! or other group yells; (6) Students are good in presenting their group's answer; (7) Students were good in responding to the

presentation of their friends' work; (8) Students were not on time in working on the problems. The observation sheet Cycle 2 showed that students' active learning in integral calculus course that implemented cooperative learning course review horay type aided macromedia flash media get score 25 incresing 5 points from cycle 1 with category active.

*4. Final Test Cyce 2 Score*

The analysis of the score of the test cycle 2 obtained that average of student test scores was 61.44 increasing 14 point from cycle 1.

*5. Questionnaire Cycle 2*

The analysis of questionnaire cycle 2 presented that 58.33% students had positive respons decreasing 5,3% from cycle 1, and 41.67% students had very positive respons increasing 11,37% from cycle 1. There was no students have negative or very negative responses.

*6. Reflection 2*

The accomplishment in cycle 2: (1) Students were good in using macromedia flash media for students; (2) Students were good in paying attention to the lecture randomly displaying questions using macromedia flash media; (3) Students were good in presenting their group's answer; (4) Students were good in responding to the presentation of their friends' work; (5) Based on the observation sheet Cycle 2 known that students' active learning got score 25 with category active; (6) 58.33% students had positive respons, and 41.67% students had very positive respons.

The things that had not been achieved in cycle 2: (1) Students were fair in working together to solve problems; (2) Students were fair in discussing the answers of the questions with their friends in a group; (3) Students were fair in saying horay! or other group yells; (4) Students were not on time in working on the problems; (5) Based on the analysis of the score of the test cycle 2 known that average of student test scores was 61.44.

**c. Cycle 3**

*1. Action Plans 3*

Action plans cycle 3 as follow: (1) Overcome students who were still fair in working together to solve problems; (2) Overcome students who were still fair in discussing the answers of the questions with their friends in a group; (3) Overcome students who were still fair in saying horay! or other group yells; (4) Overcome students who were not on time in working on the problems; (5) Overcome students having low learning outcomes.

*2. Implementation of actions 3*

The instructional process of integral calculus courses that applied cooperative learning course review horay aided macromedia flash media as the implementation of actions in cycle 3 was conducted with the following steps: (1) Designed questions with answers without negative values; (2) Lecturer delivered basic competencies and learning outcomes indicators; (3) Lecturer presented material; (4) Lecturer gave students a question and answer opportunity; (5) Students were divided into groups by the number of members of the heterogeneous groups of 4-5 students; (6) Lecturer gave macromedia flash media for student to student; (7) Lecturer explained the rule of using macromedia flash media that once they insert an answer to the box, they can not change it; (8) Lectures asked students to pay attention to the lecture randomly displaying questions using macromedia flash media; (9) Lecturer explained the general discussion that will be done; (10) Lecturer asked students to draw the figure of their answer on a paper; (11) Lecturer reminded students that if they work together and discuss with their friends in a group, the questions can be solve easier; (12) Lecturer read questions selected randomly on macromedia flash media for lecturers; (13) Lecturer asked each group to discuss directly answer questions in the group in a specified time, and if they are late in submitting their works, their group will get pinalty that is reducing score; (14) Students typed answer in a box that number is mentioned by the lecturer. If the answer is correct, true mark (√) will appear. If wrong, a cross (x) will appear; (15)

Lecturer chose students as representatives of groups to present the groups' answers; (16) Lectures stimulated other students with questions to respond to presented works of their friend; (17) Lecturer continued reading numbers selected on macromedia flash media for lecturers as in step 12, followed by steps 13, 14, 15, and 16, and so on until all numbers are read; (18) Lecturer asked students who have got marks √ vertical, horizontal, or diagonal to shout horay! or other yells without instructions from the lecturer if they want get bonuses; (19) Lecturer determined students' marks from the number of correct answers and the number of horay! that students obtained.

*3. Observation 3*

The observations of the implementation cycle 3 showed that: (1) Students were good in working together to solve problems; (2) Students were good in discussing the answer of the questions with their friends in a group; (3) Students were good in saying horay! or other group yells; (4) Students tried to submitting their works on time. Based on the observation sheet Cycle 3 known that students' active learning in integral calculus course that implement cooperative learning course review horay type aided macromedia flash media get score 28 incresing 3 points from cycle 2 with category active.

*4. Final Test Cyce 3 Score*

The analysis of the score of the test cycle 3 stated that average of student test scores was 84.11 increasing 22.67 point from cycle 2.

*5. Questionnaire Cycle 3*

The analysis of questionnaire cycle 3 presented that 64.86% students had positive respons increasing 6,53% from cycle 2, and 35.14% students had very positive respons decreasing 6,53% from cycle 2.

*6. Reflection 3*

The achievement in cycle 3: (1) Students were good in working together to solve problems; (2) Students were good in discussing the answer of the questions with their friends in a group; (3) Students were good in saying horay! or other group yells; (4) Students try to submitting their works on time; (5) Based on the observation sheet Cycle 3 known that students' active learning got score 28 with category active; (6) Based on the analysis of the score of the test cycle 3 known that average of student test scores was 84.11; (7) 64.86% students had positive respons, and 35.14% students had very positive respons.

## 6. Conclusions

Based on this research, it can be concluded that :

1. The way to increase students' active learning in integral calculus course that implement cooperative learning course review horay type aided macromedia flash media : (a) Design questions with answers without integer numbers; (b) Students were divided into groups by the number of members of the heterogeneous groups of 4-5 students; (c) Lecturer explains the rule of using macromedia flash media that once they insert an answer to the box, they can not change it; (d) Lecturer asks students to pay attention to the lecture randomly displaying questions using macromedia flash media; (e) Lecturer asks each group to discuss directly answer questions in the group in a specified time, and if they are late in submitting their works, their group will get pinalty that is reducing score.
2. The way to increase students' responses in integral calculus course that implement cooperative learning course review horay type aided macromedia flash media : (a) Lecturer asks students who have got marks √ vertical, horizontal, or diagonal to shout horay! or other yells without instructions from the lecturer if they want get bonuses; (b) Lecturer stimulates other students with questions to respond to presented works of their friend.
3. The way to increase students' learning outcomes in integral calculus course that implement cooperative learning course review horay type aided macromedia flash media: (a) Lecturer reminds students that they have work together and discuss the answers of questions with their friends in a group; (b) Lecturer reminds students

that if they have work together, the questions can be solve easier; (c) Lecturer asks students to write their answer on a paper; (d) Lecturer asks students to draw the figure of their answer on a paper; (e) Lecturer chooses students as representatives of groups to present the groups' answers.

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